Wide Field Astronomy Unit (WFAU)

Virtual Observatory
Data Access service

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May 2013

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Target use cases :

- JOIN queries combining data in from catalogs within ROE

- JOIN queries combining data from external TAP services

- Storage for user data, including uploaded data and query results

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Implemented using

- ADQL parser from CDS

- SQL Server cluster at ROE

- OGSA-DAI DQP service from EPCC
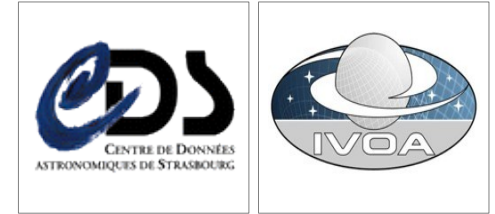
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ADQL library from CDS

- ADQL syntax checking

- Data structure validation

- SQL dialect translation

Extensible architecture makes it easy to customize.

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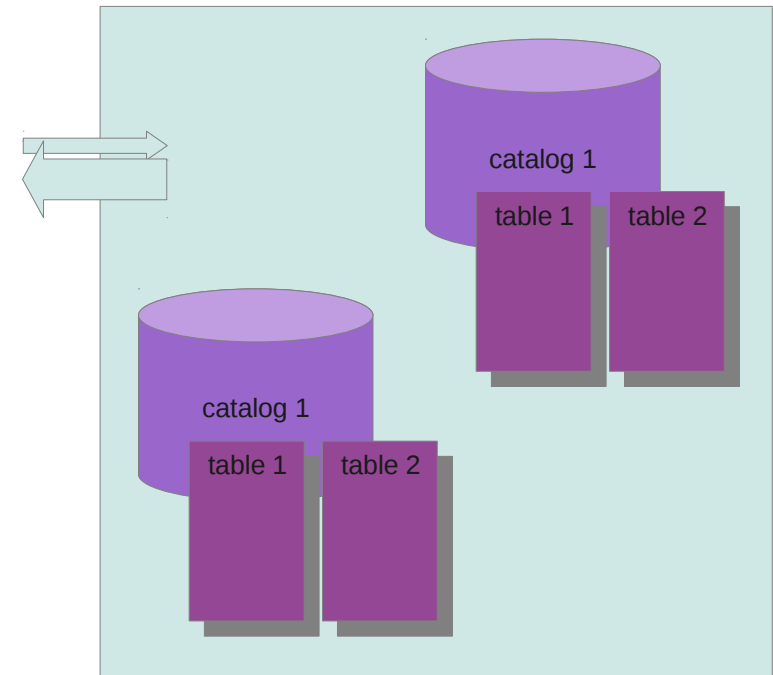**Microsoft**

SQL Server cluster at ROE

- Supports cross catalog queries within the system
- All the tables are accessible from a single namespace

```
SELECT
    catalog1.schema1.table1.column1,
    catalog2.schema2.table2.column2,
FROM
    catalog1.dbo.table1
JOIN
    catalog2.dbo.table2
ON
    ....
WHERE
    ....
```

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OGSA-DAI service from EPCC

- Middleware services enabling federation od heterogeneous data resources.

- Used in a wide range of applications including medical research, geographical information systems, meteorology, transport, computer-aided design, engineering and astronomy.
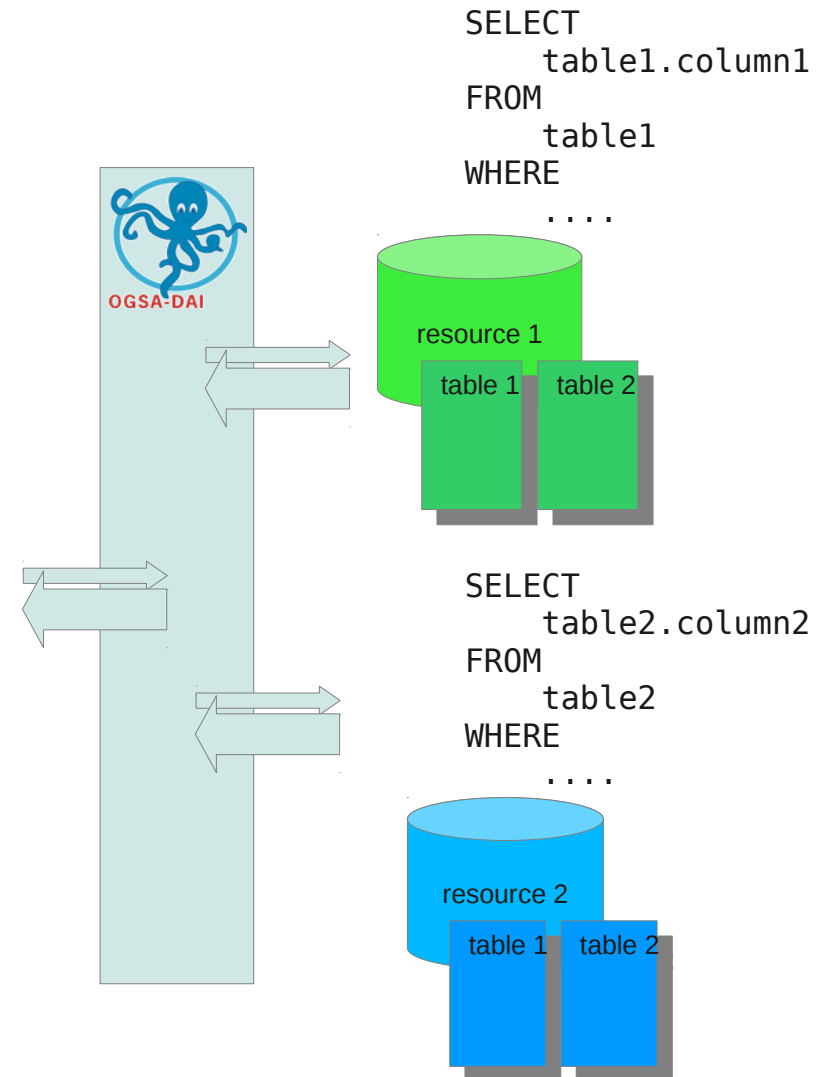
resource 1

table 1   table 2

resource 2

table 1   table 2

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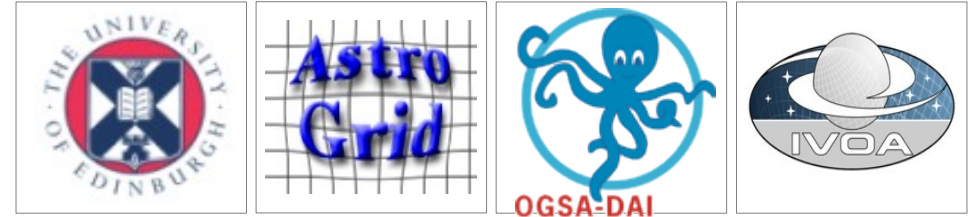May 2013
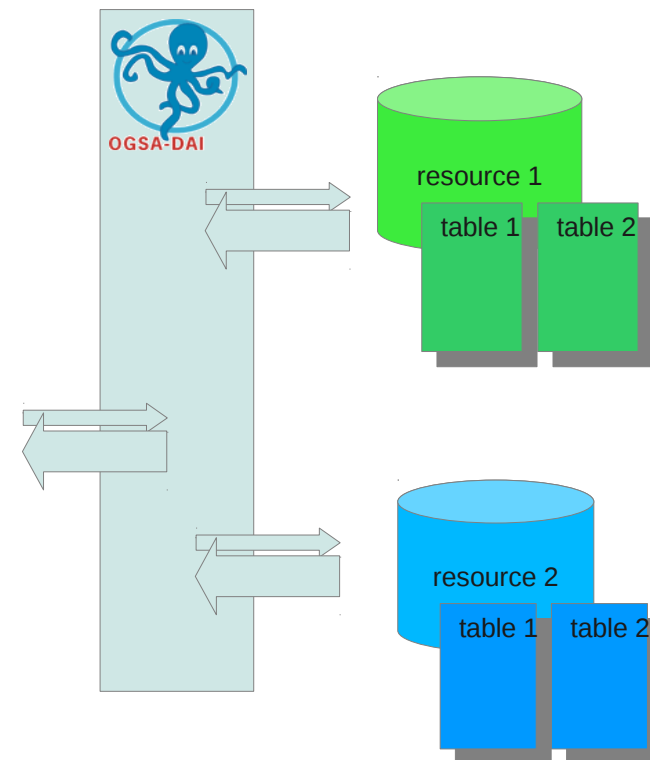
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Distributed Query Processor (DQP)

- Splits a JOIN query into separate sub-queries for each resource

- Combines the results from each sub-query to recreate the original JOIN

```
SELECT
    resource1.table1.column1,
    resource2.table2.column2,
FROM
    resource1.table1
JOIN
    resource2.table2
    ....
```

```
SELECT
    table1.column1
FROM
    table1
WHERE
    ....
```

resource 1

table 1   table 2

```
SELECT
    table2.column2
FROM
    table2
WHERE
    ....
```

resource 2

table 1   table 2

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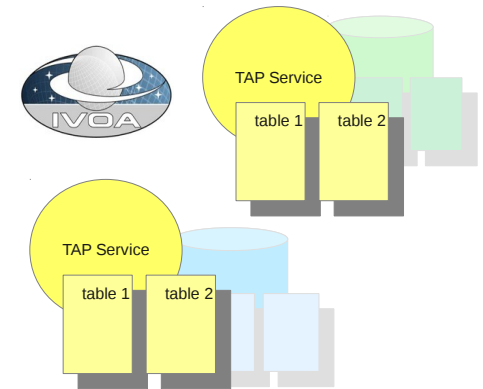Edinburgh University
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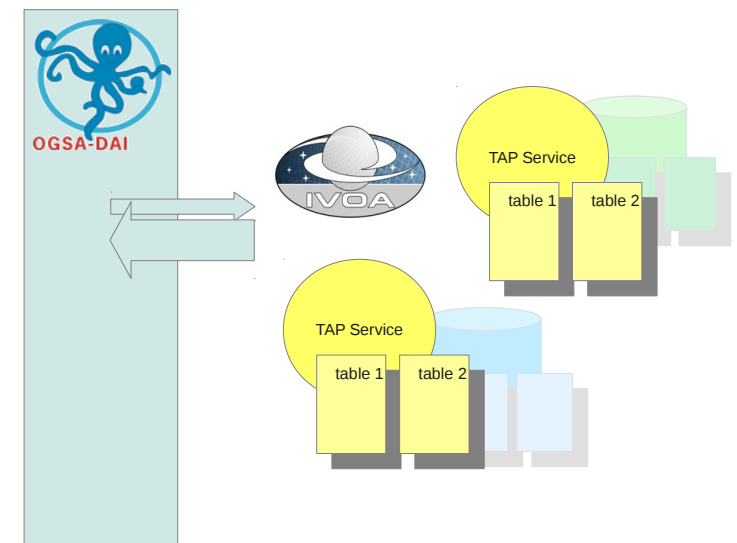# Data Access service

IVOA TAP services

- Provides a common abstraction for databases
- Hides the implementation details
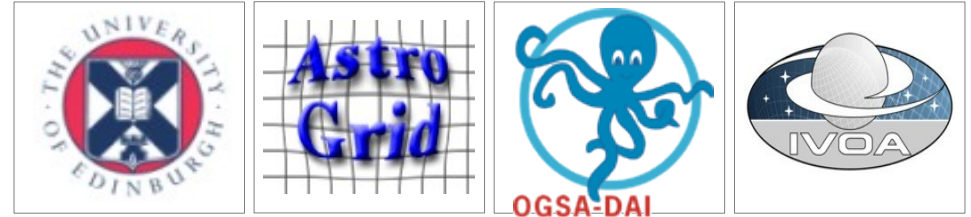- Services from different data providers behave the same way

OGSA-DAI astronomy extensions

- Developed for ROE by EPCC
- Enabling OGSA-DAI to use IVOA data services

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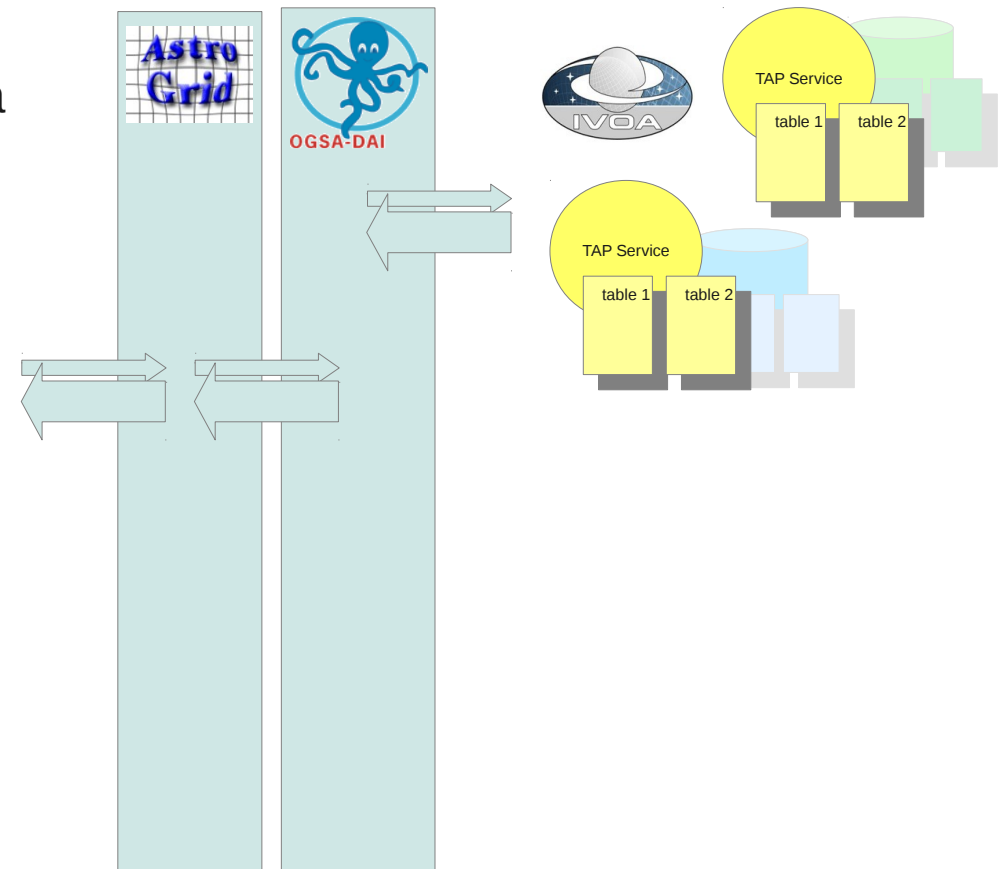
OGSA-DAI TAP Factory

- Prototype federated TAP service
- Developed for ROE by EPCC

- Using OGSA-DAI DQP to combine data from external TAP services

- Using AstroGrid DSA to provide TAP interface

```
SELECT
    service1.table1.column1,
    service2.table2.column2,
FROM
    service1.table1
JOIN
    service2.table2
    ....
```

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New data access service

- New metadata service to create a virtual 'data space'
- Combining local and remote data
- Local JOINS executed within SQL Server
- Remote JOINS processed by DQP

```
SELECT
    resource1.table1.column1,
    resource2.table2.column2,
FROM
    resource1.table1
JOIN
    resource2.table2
    ....
```


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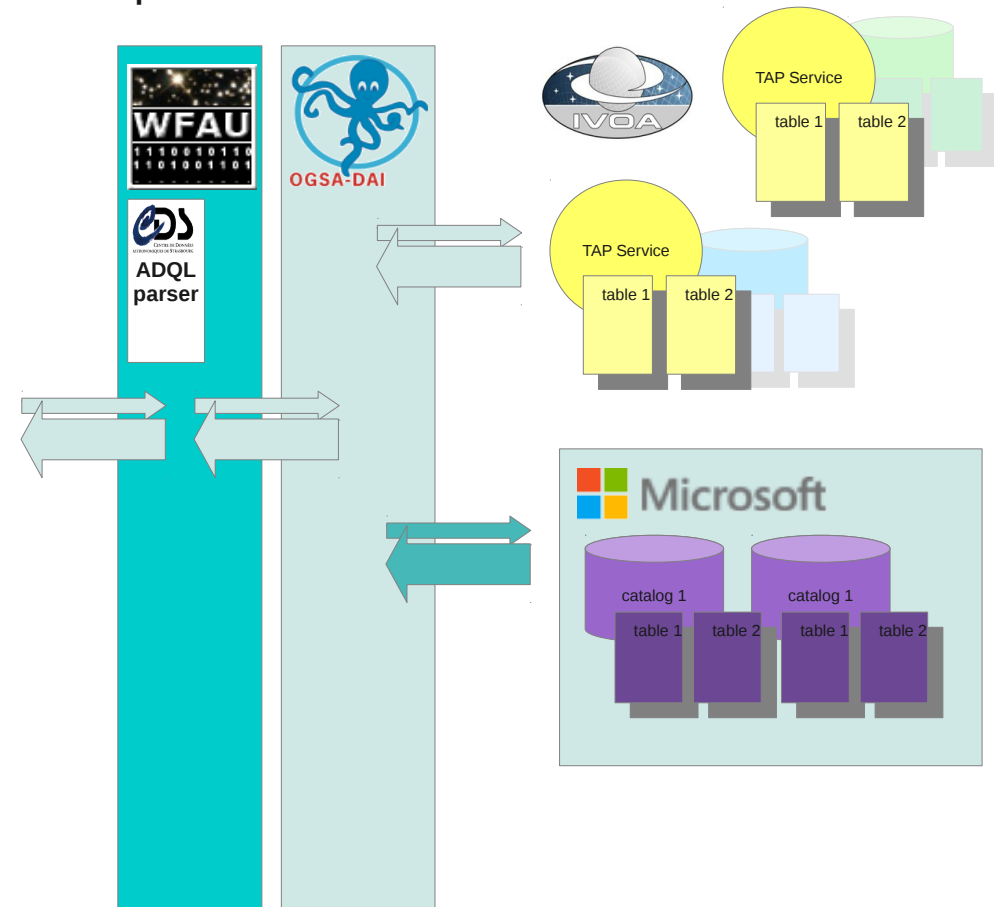
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New data access service

- User data appears within the same virtual space

- Results from ADQL queries automatically stored in users space

- Available for query in combination with local catalogs and remote TAP services

```
SELECT
     resource.table1.column1,
     userdata.table2.column2,
FROM
     resource.table1
JOIN
     userdata.table2
     ....
```
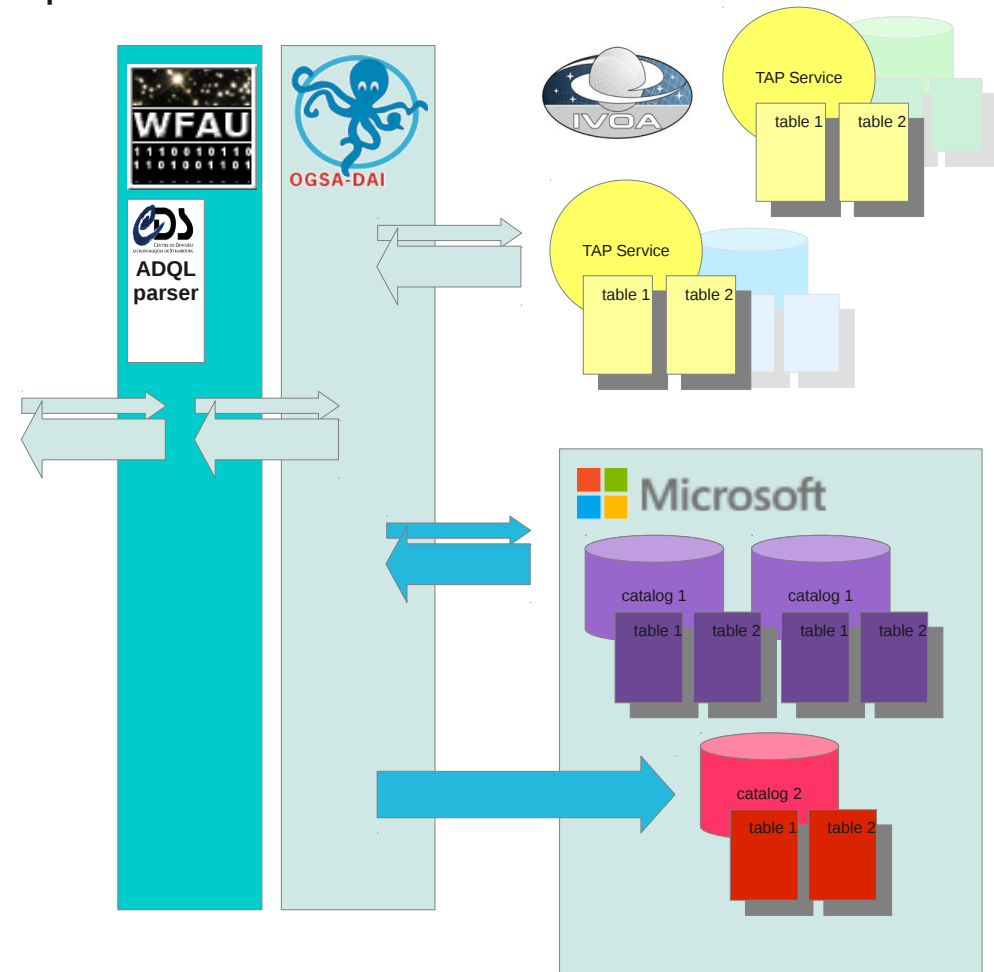
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Target use cases :

- JOIN queries combining data from catalogs within ROE
  - processed locally within SQL Server

- JOIN queries combining data from external TAP services
  - processed using OGSA-DAI DQP

- Storage for user data, including uploaded data and query results
  - stored as database tables, available to be used in queries

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